

MAR 19 2009

Appl. No. 10/765,808
Amdt. Dated 03/19/2009
Response to Office Action of 11/24/2008

Attorney Docket No.: N1085-00256
[TSMC2003-0899]

REMARKS/ARGUMENTS

Claims 1-7, 9-12 and 29-33 were previously pending in the subject patent application and each was rejected.

Claims 1, 3, 11-12 and 29 are amended herein.

5 Applicants respectfully request re-examination, reconsideration and allowance of each of pending claims 1-7, 9-12 and 29-32.

I. **Claim Rejections – 35 U.S.C. § 112**

10 In paragraphs 4-6 of the subject Office Action, claims 3, 11 and 12 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. These claim rejections are overcome for reasons set forth below.

Claims 3, 11 and 12 have each been amended responsive to the Examiner's comments and are each believed to now be in compliance with the requirements of 35 U.S.C. § 112, second paragraph.

15 The rejection of claims 3, 11 and 12 under 35 U.S.C. § 112, second paragraph, should therefore be withdrawn.

II. **Claim Rejections – 35 U.S.C. § 102**

20 In paragraph 9 of the subject Office Action, claims 1-2, 4-6, 9-12 and 29-32 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,529,657 to Ishii. Applicants respectfully submit that these claim rejections are overcome for reasons set forth below.

Claims 1 and 29 stand as the independent claims of the claims rejected under this section. Claim 1 recites the features of:

25 A plasma etching apparatus comprising a chuck adapted to retain a substrate thereover and hardware that is formed of a material that includes oxygen impregnated therein ...

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wherein said hardware comprises a focus ring and at least a portion of said focus ring substantially continuously extends directly underneath a peripheral portion of said chuck.

Independent claim 29 recites the features of:

5 A plasma etching apparatus comprising a chuck adapted to retain a substrate thereover and a focus ring ... formed of a focus ring material that includes oxygen throughout the focus ring material ... wherein at least a portion of said focus ring substantially continuously extends directly underneath a
 10 peripheral portion of said chuck.

Independent claims 1 and 29 now each more clearly point out that the focus ring extends underneath the chuck whereas the substrate is retained over the chuck. Stated alternatively, because of the recitation of the terms "thereover" and "directly underneath", the substrate and focus ring portion are on opposite sides of the chuck.
 15 More particularly, the peripheral portion of the focus ring that is disposed "directly underneath" the chuck, is disposed on the opposite side of the chuck than the substrate which is retained "thereover". Ishii does not teach this feature and claims 1 and 29 are distinguished from Ishii for at least this reason. Moreover, in each of claims 1 and 29, the focus ring material is an oxygen impregnated (or oxygen-containing) material and
 20 therefore it is necessarily this oxygen impregnated / oxygen-containing material that extends directly underneath a peripheral portion of the chuck.

Ishii does not disclose a substrate that is retained on top of the chuck and a focus ring extending directly underneath (a peripheral portion of) the chuck, i.e. Ishii does not disclose a focus ring and substrate disposed on opposite sides of the chuck.

25 The Examiner points to the embodiment covered by FIG. 20 of Ishii but FIG. 20 of Ishii is difficult to understand because it is full of errors and undefined features. For example, reference numbers 12, 13, 17, 4a and 4c appear in the illustration of FIG. 20 and point to important features of FIG. 20, but are not defined anywhere in the Ishii specification. Moreover, in FIG. 20, feature 6, which is defined several times in the
 30 specification as the focus ring, appears to be an RF antenna such as the RF antenna 7

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that appears in other figures. Moreover, throughout the specification, feature 71 is referred to as an RF power supply and feature 7 as an RF antenna, but in FIG. 20, reference number 7 appears to point to an RF power supply. This inconsistency cannot be attributed to different reference numbers being used to designate different features in different figures such as FIG. 20, because column 3, line 54 – column 4, line 15 discloses the basic features of the first embodiment shown in FIG. 1 and column 7, lines 60-65 provides, in essence, that like numbers denote like features throughout the specification, with respect to the first embodiment of FIGS. 1-9 and the further embodiments shown in FIGS. 10-23. In other words, the labeling of the features in FIG. 20 leaves more than something to be desired and the figure cannot reasonably be interpreted in reliance upon the reference numbers as they are identified in the specification.

Feature 3 is disclosed to be a “rest table 3” and feature 4 is disclosed to be “chuck 4”, “electrostatic chuck 4” or “chuck sheet 4” throughout the specification.

In the Office Action, specifically in paragraph 10, the Examiner alleges that feature 3 of FIG. 20 of Ishii represents a chuck and feature 17 of Ishii is a focus ring formed of a material that includes oxygen impregnated throughout and therein. Applicants first point out that feature 17 is completely undefined in the Ishii specification and it would therefore be speculative to assign it any identity. Moreover, feature 3 is clearly not a chuck. A chuck and a “rest table” are clearly distinguished from one another. For example, FIG. 5 shows chuck 4 resting on rest table 3, more appropriately chuck 4 resting upon rest section 31 of rest table 3. Wafer W sits on chuck 4. Rest table 3 and chuck 4 are not interchangeable terms. Rest table 3 is a much more massive feature than chuck 4 (alternatively referred to as “chuck sheet 4”) which is a thin sheet that rests on and is supported by rest table 3 as illustrated in most figures.

In column 13, lines 12-14, Ishii introduces FIG. 20 by reciting: “For example, a face-down method as shown in FIG. 20 may be employed. In this apparatus, elements identical to the respective constituent elements of the processing apparatus shown in

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FIG. 10 are arranged almost upside down". Applicants refer to the annotated copy of FIG. 20 attached hereto and respectfully submit that the only plausible interpretation of the figure, based on the preceding language used to introduce FIG. 20, is that the chuck is the feature labeled "CHUCK" in the annotated FIG. 20, i.e. the feature against which the moveable support mechanism 140 urges wafer W, which is positioned face-down. The other side of this "CHUCK" rests against the feature 4c, 4a that can only reasonably be interpreted to be the rest table. Reference number 4 that appears in the upper right hand corner of FIG. 20, does not point to the very thin chuck or chuck sheet as in the other figures of Ishii. In "upside-down" FIG. 10, the corresponding arrow pointing to the same structure, is the lead-line for reference numeral "3", the rest table. Consistently throughout the Ishii specification, the rest table 3 is described and shown as a thick block with chuck or chuck sheet 4 being a thin slice. Nowhere is it suggested that the chuck 4 may alternatively be a big block in another embodiment.

At any rate, there is clearly no chuck member of Ishii that satisfies the requirements of a) a substrate retained over a first surface thereof and b) an oxygen impregnated, oxygen-containing focus ring disposed directly underneath a peripheral portion of the opposite side of the chuck. Even FIG. 5 of Ishii does not show focus ring 6 directly underneath chuck 4 and Applicants further point out that the proximate portion of focus ring 6, portion 6b, is formed of a conductive material, not an oxygen impregnated material.

Ishii therefore does not provide the recited feature of a chuck for retaining a substrate thereover and a focus ring formed with an oxygen impregnated/oxygen-containing material directly underneath the other side of the chuck. Claims 1 and 29 are therefore distinguished from Ishii and claims 2, 4-6, 9-12 and 30-32 are similarly distinguished by virtue of their respective dependencies.

The rejection of claims 1-2, 4-6, 9-12 and 29-32 under 35 U.S.C. § 102(b), should be withdrawn.

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III. Claim Rejections – 35 U.S.C. § 103

In paragraph 22 of the subject Office Action, claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishii and further in view of additional teachings of Ishii. This rejection is overcome for reasons set forth below.

5 Claim 7 depends from claim 1 which is distinguished from Ishii as above. The Examiner concedes that Ishii fails to teach a focus ring set and refers to FIGS. 5 and 8. As above, the inner annular member 6b is formed of a conductive material (column 4, lines 53-54) and is not disposed underneath a chuck in FIG. 5. FIG. 8 provides no
10 oxygen-containing/oxygen impregnated material under a chuck, above which a wafer is disposed, much less a lower focus ring of a set of focus rings satisfying this limitation.

The Examiner's comments do not make up for the above-stated deficiencies of Ishii and therefore claim 1 and also claim 7 are distinguished from and not obvious in view of Ishii.

15 The rejection of claim 7 under 35 U.S.C. § 103 should be withdrawn.

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CONCLUSION

Based on the foregoing, each of pending claims 1-7, 9-12 and 29-32 is in allowable form and the application in condition for allowance, which action is respectfully and expeditiously requested.

5 The Assistant Commissioner for Patents is hereby authorized to charge any fees necessary to give effect to this filing and to credit any excess payment that may be associated with this communication, to Deposit Account 04-1679.

Respectfully submitted,

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Attachment: Annotated FIG. 20 of U.S. Patent 5,529,657

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